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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,658	02/06/2002	Yan-Xiu Zheng	06720.0083-	5725

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EXAMINER

TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 03/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,658

Applicant(s)

ZHENG ET AL.

Examiner

Joseph D. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-44 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 35-44 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 07 October 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The proposed drawing corrections received on 10/07/2004 are approved. New corrected drawings with proposed correction in compliance with 37 CFR 1.121(d) are required. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Response to Arguments

2. Applicant's arguments with respect to claims 35-44 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 38, 43 and 44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to

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which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 35 recites, "A device used for interleaving in turbo codes", in the preamble. Claim 39 recites, "A method for interleaving in turbo codes", in the preamble. Nowhere does the Applicant teach de-interleaving as part of a device or method for interleaving in turbo codes as recited in the preambles of claims 38, 43 and 44.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 35-44 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. Claim 35 recites, "A device used for interleaving in turbo codes", in the preamble. The omitted elements are: any relationship between device hardware in the preamble and the interleaving algorithm in the body of claims 35-38. The omitted elements are: any relationship between turbo codes in the preamble and the interleaving algorithm in the body of claims 35-38.

Claim 39 recites, "A method for interleaving in turbo codes", in the preamble. The omitted elements are: any relationship between turbo codes in the preamble and the interleaving algorithm in the body of claims 39-44.

Claims 38, 43 and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 35 recites, "A device used for interleaving in

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turbo codes", in the preamble. Claim 39 recites, "A method for interleaving in turbo codes", in the preamble. De-interleaving is not part of a device or method for interleaving in turbo codes.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 35-44 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The body of claims 35-44 is directed to an abstract algorithm that can be carried out by hand or by computer software without any connection to any tangible hardware device. Abstract algorithms are non-statutory subject matter. Computer software is non-statutory subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 35-37 and 39-41 are rejected under 35 U.S.C. 102(b) as being anticipated by the 3GPP document (3rd Generation Partnership Project; Technical Specification Group; Group Radio Access Network; Multiplexing and channel coding (FDD); (3G TS 25.212 version 3.1.0) (1999)).

35 U.S.C. 102(b) rejection of claims 35 and 39.

The 3GPP document teaches a means for grouping a source sequence of symbols into a sequence of M blocks, wherein M is a number of the blocks and M is determined by the number of symbols of a source sequence (Step 1 in the First Stage on page 16 of the 3GPP document teaches grouping a source sequence of symbols into a sequence of $M=R$ row blocks, wherein $M=R$ is a number of the row blocks and $M+R$ is determined by the number K of symbols of a source sequence), and wherein each block includes L number of symbols (p 1 in the First Stage on page 16 of the 3GPP document teaches each block includes $L=C$ number of symbols); means for performing intra-block permutations on the sequence of $M=R$ blocks to produce an intra-block permuted sequence by reordering the symbols within each block of the sequence of M blocks (The Second Stage on page 16 and 17 of the 3GPP document teaches performing intra-row/block permutations on the sequence of $M=R$ row blocks to produce an intra-row/block permuted sequence by reordering the symbols within each row block j by outputting the $c_j(i)$ bit to the i^{th} position in the intra-row/block permuted row for each of the sequence of M blocks); means for grouping the intra-block permuted sequence into an intra-permuted sequence of blocks (The Second Stage on pages 16 and 17 of the 3GPP document teaches that the sequence of intra-row/block permuted row sequences forms an intra-permuted sequence of row blocks grouped by rows); and means for performing inter-block permutations, on the intra-block permuted sequence of blocks by re-ordering the symbols in each block of the intra-permuted sequence of

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blocks across a number of blocks to form an interleaved output sequence of symbols (The third stage on page 17 of the 3GPP document teaches performing inter-row/block permutations, on the intra-row/block permuted sequence of blocks by re-ordering the symbols in each row block of the intra-permuted sequence of blocks across a number of row blocks to form an interleaved output sequence of symbols), wherein the symbols of a given row block in the intra-permuted sequence of blocks are re-ordered across E_K blocks prior to the given block K and L_K blocks after the given block K , wherein E_K is an integer of $\min(D, K-1)$ and L_K is an integer of $\min(D, M-K)$, and D is a parameter associated with the inter-block permutation (The third stage on page 17 of the 3GPP document teaches that the symbols of a given row block in the intra-permuted sequence of blocks are re-ordered across E_K blocks prior to the given block $K=j$ and L_K blocks after the given block K , wherein E_K is an integer of $\min(D, K-1)$ and L_K is an integer of $\min(D, M-K)$, and D is a parameter associated with the inter-block permutation; Note: $R=M$ is a parameter associated with the inter-block permutation; hence if $D=R=M$, then $E_K = \min(D, K-1) = K-1$ and $L_K = \min(D, M-K) = M - K$).

35 U.S.C. 102(b) rejection of claims 36 and 40.

The Second Stage on page 16 and 17 of the 3GPP document teaches performing intra-row/block permutations on the sequence of $M=R$ row blocks to produce an intra-row/block permuted sequence by reordering the symbols within each row block j by outputting the $c_j(i)$ bit to the i^{th} position in the intra-row/block permuted row for each

of the sequence of M blocks to re-order symbols within blocks of the sequence of symbols of a first length.

35 U.S.C. 102(b) rejection of claims 37 and 41.

The third stage on page 17 of the 3GPP document teaches performing inter-row/block permutations, on the intra-row/block permuted sequence of blocks by re-ordering the symbols in each row block of the intra-permuted sequence of blocks across a number of row blocks to form an interleaved output sequence of symbols which is a means for performing inter-block permutations re-order symbols of blocks across their immediate neighboring 2D intra-block permuted sequence of symbols of a second length.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over the 3GPP document (3rd Generation Partnership Project; Technical Specification Group; Group Radio Access Network; Multiplexing and channel coding (FDD); (3G TS 25.212 version 3.1.0) (1999)) in view of Suda; Hirohito et al. (US 6553516 B1, hereafter referred to as Suda).

35 U.S.C. 103(a) rejection of claim 42.

The 3GPP document substantially teaches the claimed invention described in claims 39-41 (as rejected above).

However the 3GPP document does not explicitly teach the specific use of simultaneous intra-block and inter-block permutations.

Suda, in an analogous art, teaches use of simultaneous intra-block and inter-block permutations (Figure 5 teaches that all three stages used in intra-block and inter-block permutations are performed substantially, simultaneously).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the 3GPP document with the teachings of Suda by including an additional step of use of simultaneous intra-block and inter-block permutations. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of simultaneous intra-block and inter-block permutations would have provided the opportunity speed up interleaving.

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8. Claims 38, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the 3GPP document (3rd Generation Partnership Project; Technical Specification Group; Group Radio Access Network; Multiplexing and channel coding (FDD); (3G TS 25.212 version 3.1.0) (1999)) in view of Kim; Min-Goo et al. (US 6598202 B1, hereafter referred to as Kim).

35 U.S.C. 103(a) rejection of claim 38, 43 and 44.

The 3GPP document substantially teaches the claimed invention described in claims 35-37 and 39-42 (as rejected above).

However the 3GPP document does not explicitly teach the specific use of a de-interleaver for the interleaver taught in the 3GPP document.

Kim, in an analogous art, teaches a means for performing intra-row permutations on a sequence of symbols to produce an intra-row permuted sequence and means for performing inter-row permutations on the intra-row permuted sequence of symbols (Note: a row is a block of data). Col. 5, lines 61-67 in Kim teaches that a deinterleaver performs the same operations as the interleaver on the intra-row and inter-row permuted interleaved data but in reverse order to recover the original non-interleaved sequence.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the 3GPP document with the teachings of Kim by including use of a de-interleaver for the interleaver taught in the 3GPP document. This modification would have been obvious to one of ordinary skill in the art, at the time the

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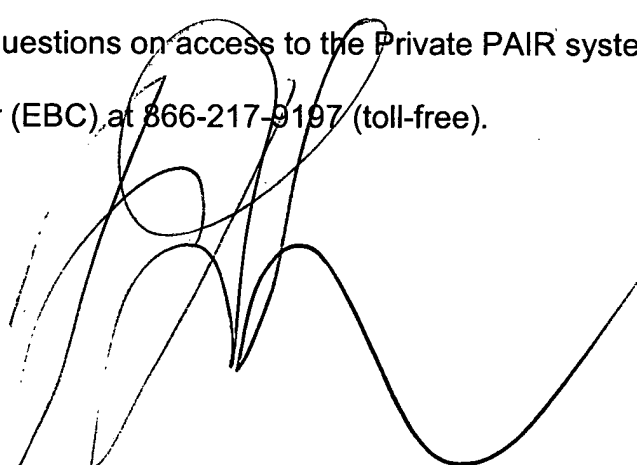
invention was made, because one of ordinary skill in the art would have recognized that use of a de-interleaver for the interleaver taught in the 3GPP document would have provided the opportunity to deinterleave interleaved data.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A large, stylized handwritten signature in black ink, appearing to read 'J. D. Torres', is written over the signature block.

Joseph D. Torres, PhD
Primary Examiner
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